Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Previously presented) Apparatus comprising:

means for directing a measurement wavefront to reflect from a measurement surface and a reference wavefront to reflect from a reference surface, the measurement and reference wavefronts being derived from a common light source;

means for directing the reflected measurement and reference wavefronts to overlap with one another and form an interference pattern, wherein paths for the measurement and reference wavefronts define an optical measurement surface corresponding to a theoretical test surface that would reflect the measurement wavefront to produce a constant optical path length difference between the measurement and reference wavefronts; and

means for varying the radius of curvature of a locally spherical portion of the optical measurement surface to contact a conical portion of the measurement surface, and detecting the interference pattern as a function of the radius of curvature.

2-5. Cancelled.

6. (Previously presented) Apparatus comprising:

means for directing a measurement wavefront to reflect from a measurement surface and a reference wavefront to reflect from a reference surface, the measurement and reference wavefronts being derived from a common light source having a coherence length;

means for directing the reflected measurement and reference wavefronts to overlap with one another and form an interference pattern, wherein paths for the measurement and reference

wavefronts define an optical measurement surface corresponding to a theoretical test surface that would reflect the measurement wavefront to produce a constant optical path length difference between the measurement and reference wavefronts; and

means for varying the radius of curvature of a locally spherical portion of the optical measurement surface to contact the measurement surface, and detecting the interference pattern as a function of the radius of curvature, wherein the radius of curvature is varied over a distance greater than the coherence length of the light source.

7-130. Cancelled.

131. (New) The apparatus of claim 1 wherein the means for directing the measurement wavefront to reflect from the measurement surface and the reference wavefront to reflect from the reference surface comprises an interferometer.

132 (New) The apparatus of claim 131 wherein the means for directing the reflected measurement and reference wavefronts to overlap with one another and form the interference pattern comprises the interferometer.

133. (New) The apparatus of claim 131 wherein the interferometer is a Twyman-Green interferometer or a Fizeau interferometer.

134. (New) The apparatus of claim 131 wherein the interferometer comprises measurement optics arranged to shape the measurement wavefront to include the locally spherical portion.

135. (New) The apparatus of claim 134 wherein the measurement optics are positioned in the path of the measurement wavefront.

136. (New) The apparatus of claim 134 wherein the measurement optics comprise an objective lens, which focuses the measurement wavefront toward a measurement point datum.

137. (New) The apparatus of claim 134 further comprising reference optics configured to shape the reference wavefront prior to the reference surface.

138. (New) The apparatus of claim 137 wherein the reference optics are positioned to direct the reference wavefront to the reference surface.

139 (New) The apparatus of claim 137 wherein the reference optics comprise a reference lens that focuses the reference wavefront towards a reference focal point.

140. (New) The apparatus of claim 137 wherein the means for varying the radius of curvature of the locally spherical portion of the optical measurement surface comprises a translation stage coupled to the interferometer and arranged to translate reference optics and reference surface to vary an optical path difference between the reflected measurement wavefronts and reflected reference wavefronts where they form the interference pattern.

141. (New) The apparatus of claim 1 wherein the means for detecting the interference pattern as a function of the radius of curvature comprises a detector arranged to detect the interference pattern.

142. (New) The apparatus of claim 141 further comprising an electronic processor in communication with the detector, the electronic processor being configured to determine a profile of the measurement surface based on the interference pattern detected by the detector as the translation stage translates the reference optics and reference surface.

143. (New) The apparatus of claim 1 wherein the constant optical path length difference between the measurement and reference wavefronts is a zero optical path length difference.

144. (New) The apparatus of claim 1 wherein the reference surface is a planar surface.

145. (New) The apparatus of claim 1 wherein the reference surface is a curved surface.

146. (New) The apparatus of claim 1 further comprising an object mount for positioning the measurement surface relative to the means for directing the measurement wavefront to reflect from the measurement surface and the reference wavefront to reflect from the reference surface.

147. (New) The apparatus of claim 146 wherein the object mount positions an object having a conical measurement surface relative to the means for directing the measurement wavefront to reflect from the measurement surface and the reference wavefront to reflect from the reference surface.

148. (New) The apparatus of claim 1 wherein the means for directing the measurement wavefront to reflect from the measurement surface and the reference wavefront to reflect from the reference surface comprises imaging optics which image a portion of the measurement surface to an image plane.

149. (New) The apparatus of claim 148 wherein the imaging optics also image the reference surface to the image plane.

150. (New) The apparatus of claim 148 wherein the detecting means is positioned at the image plane.

151. (New) The apparatus of claim 1 wherein the common light source has a coherence length and the radius-varying means is arranged to vary the radius of curvature of the locally spherical portion of the optical measurement surface over a distance greater than the coherence length of the light source.

152. (New) The apparatus of claim 6, wherein the measurement surface includes a conical surface.

153. (New) The apparatus of claim 6, wherein the means for directing the reflected measurement and reference wavefronts to overlap with one another is an interferometer.

154. (New) The apparatus of claim 153, wherein the interferometer is a Twyman-Green interferometer or a Fizeau interferometer.

155. (New) The apparatus of claim 153, further comprising a means for focusing the reference wavefront towards a reference focal point.

156. (New) The apparatus of claim 155, wherein the means for focusing the reference wavefront comprises reference optics.

157. (New) The apparatus of claim 156, wherein the means for varying the radius of curvature of the locally spherical portion of the optical measurement surface is a translation stage coupled to the interferometer and configured translate the reference optics relative to the interferometer.